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Stiles

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(54) **ONE PIECE WATER PERMEABLE PAVER**

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(51) **Int. Cl.**

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F21S 9/02	(2006.01)
E01C 5/20	(2006.01)
E01C 9/00	(2006.01)

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(52) **U.S. Cl.**

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USPC 52/223.7; 404/27–41, 16

See application file for complete search history.

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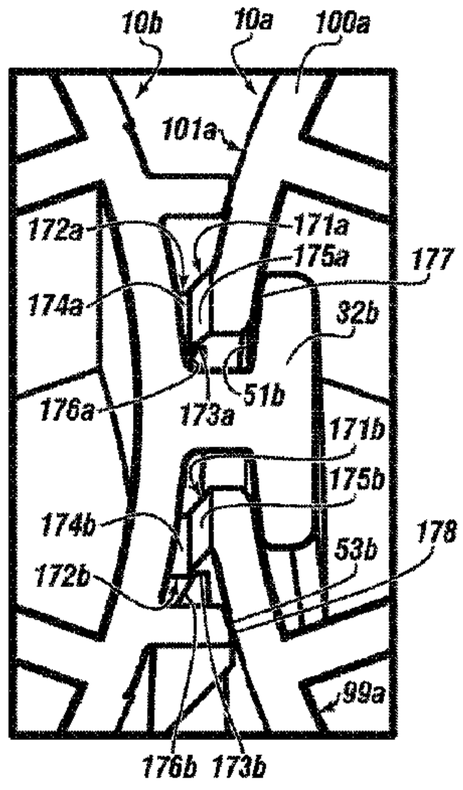
(57) **ABSTRACT**

A one piece water permeable paver for forming a surface suitable for traffic having outer flex joint connection cells connected to connectors, outer three connection cells connected to one of the outer flex joint connection cells, outer two connection cells connected to two outer three connection cells, a plurality of inner single flex joint connection cells connected to one of the connectors, and an inner dual flex joint connection cell engaging two connectors, inner four connection cells connected to a pair of outer three connection cells and a pair of inner single flex joint connection cells. Fastening slots are formed partially through outer surfaces of cells that form two sides of the paver. Locking tabs extend from outer surfaces of cells forming two sides of the paver opposite the sides with the locking tabs, enabling a first paver to securely interlock to an adjacent paver.

20 Claims, 6 Drawing Sheets



(51) **Int. Cl.**

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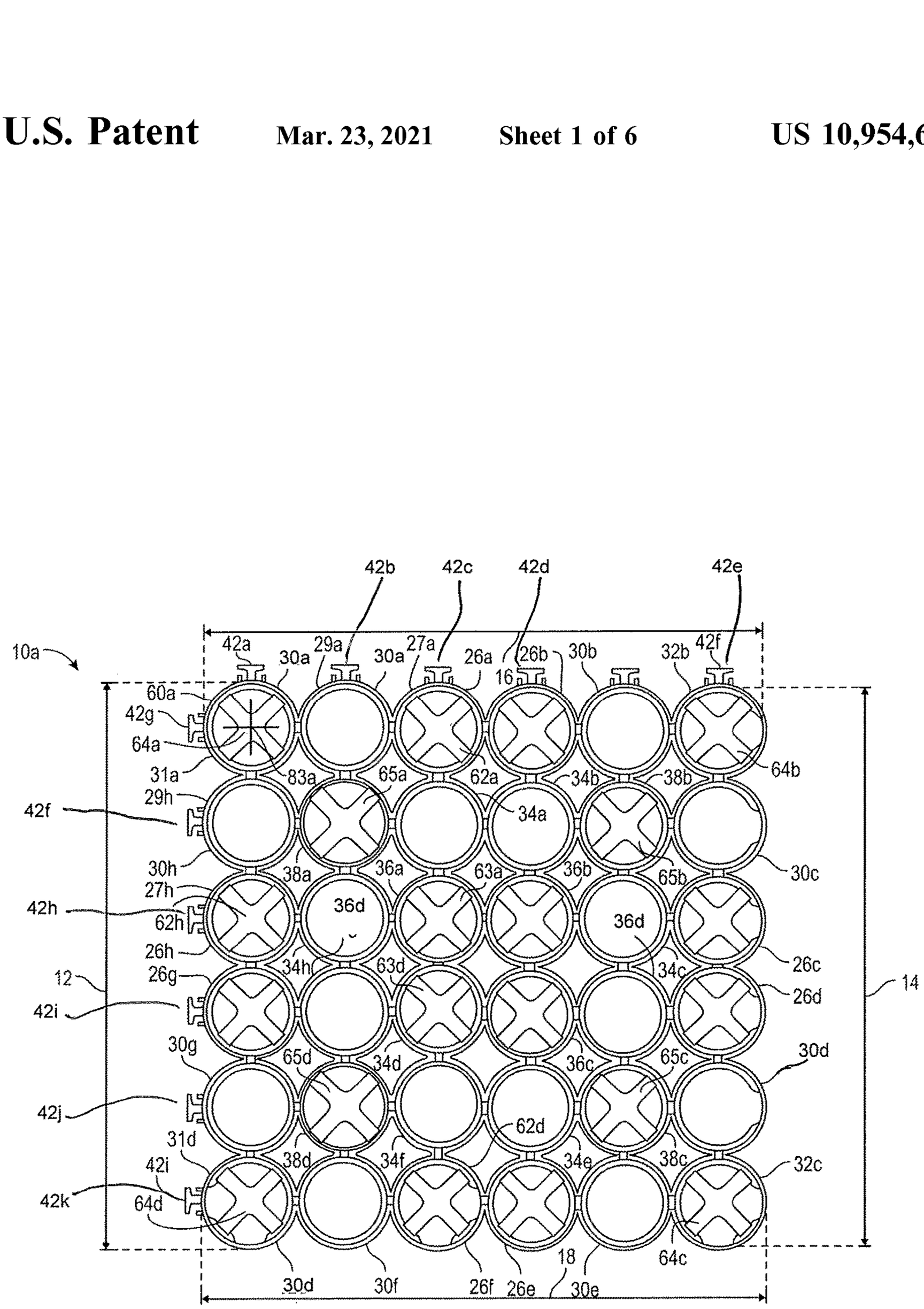
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42d
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30a
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26a
26b
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42g
64a
31a
83a
65a
62a
34b
38b
64b
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42f
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30g
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31d
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FIG. 1A

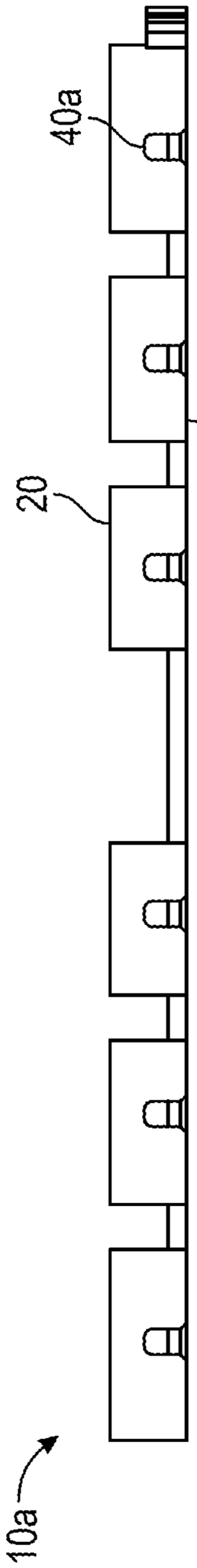


FIG. 1B

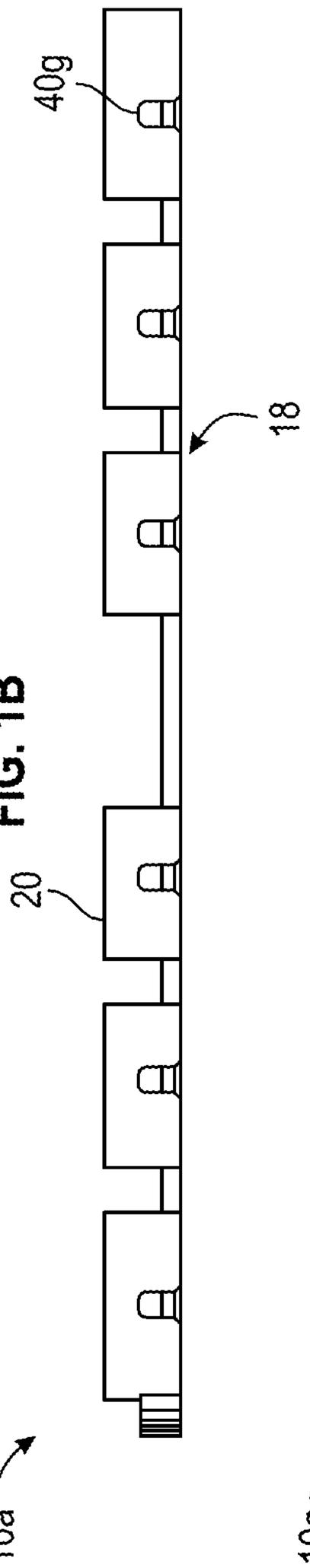


FIG. 1C

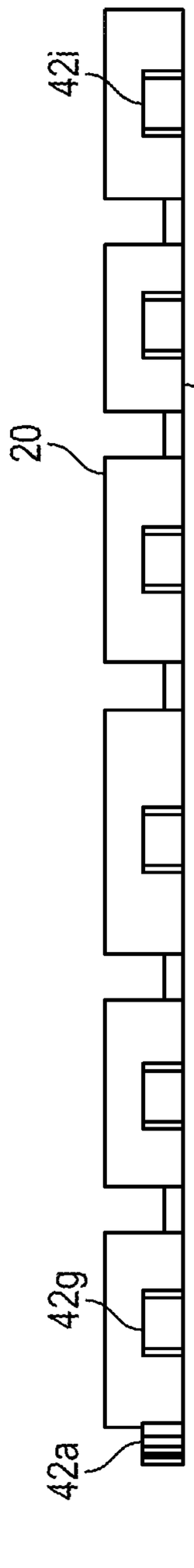


FIG. 1D

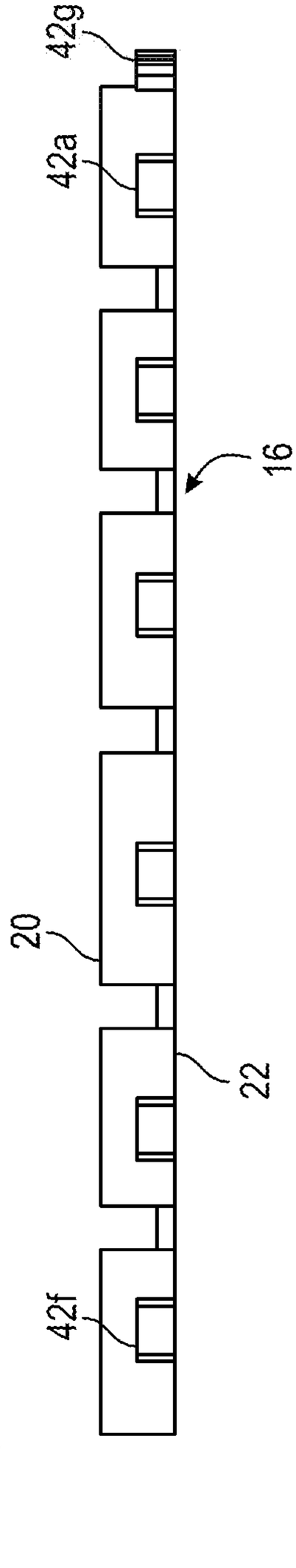
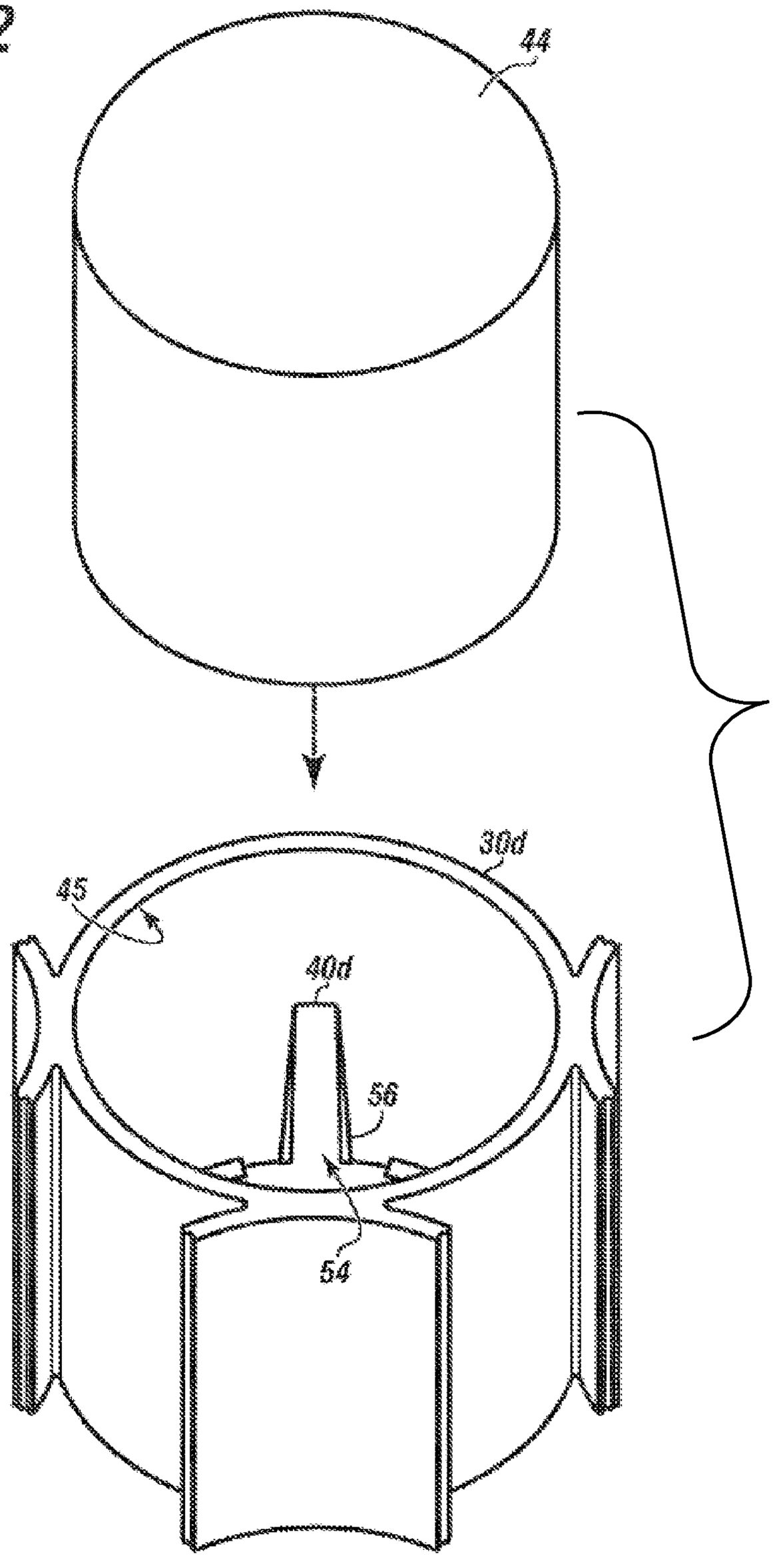


FIG. 1E

FIGURE 2



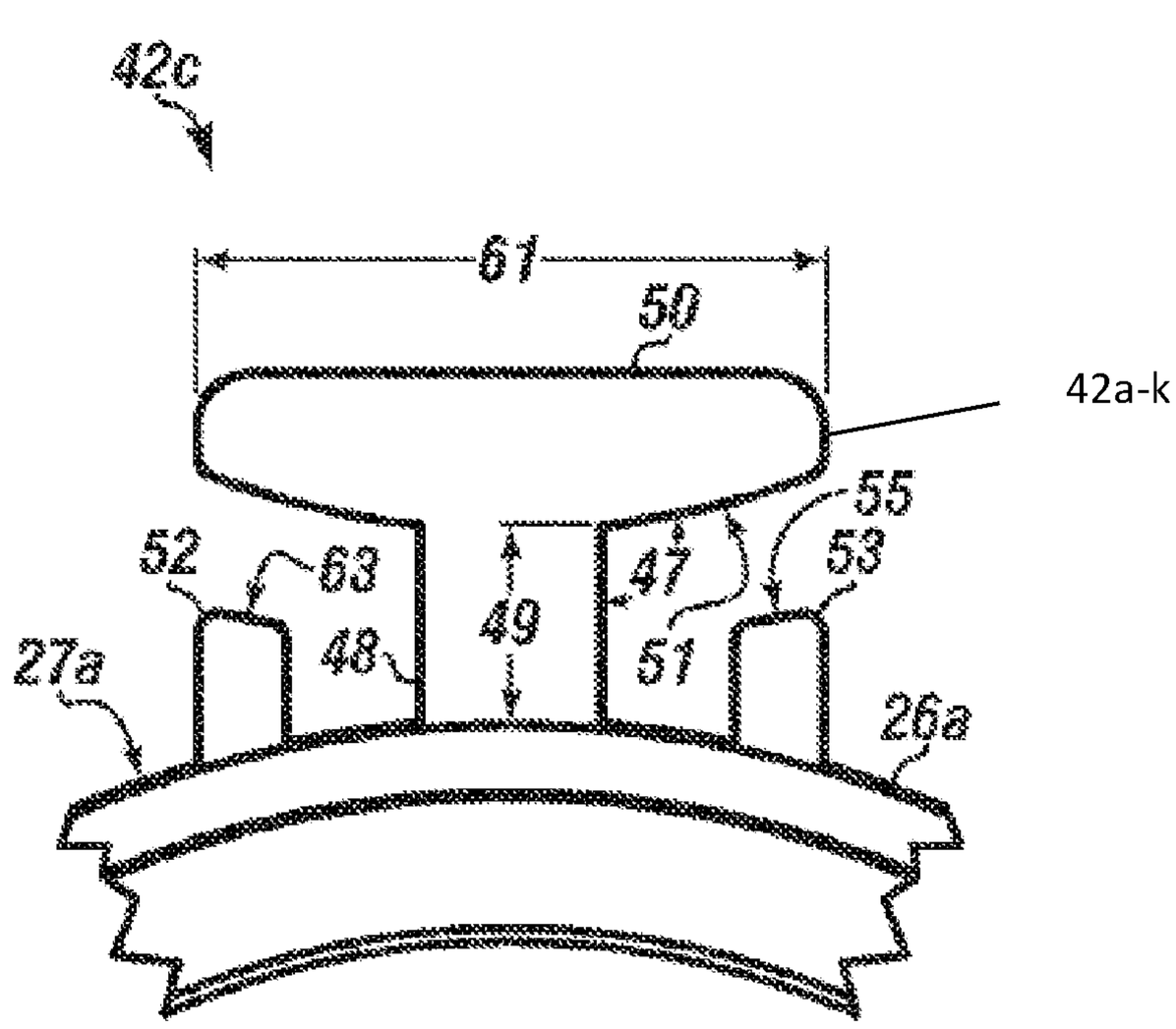


FIGURE 3

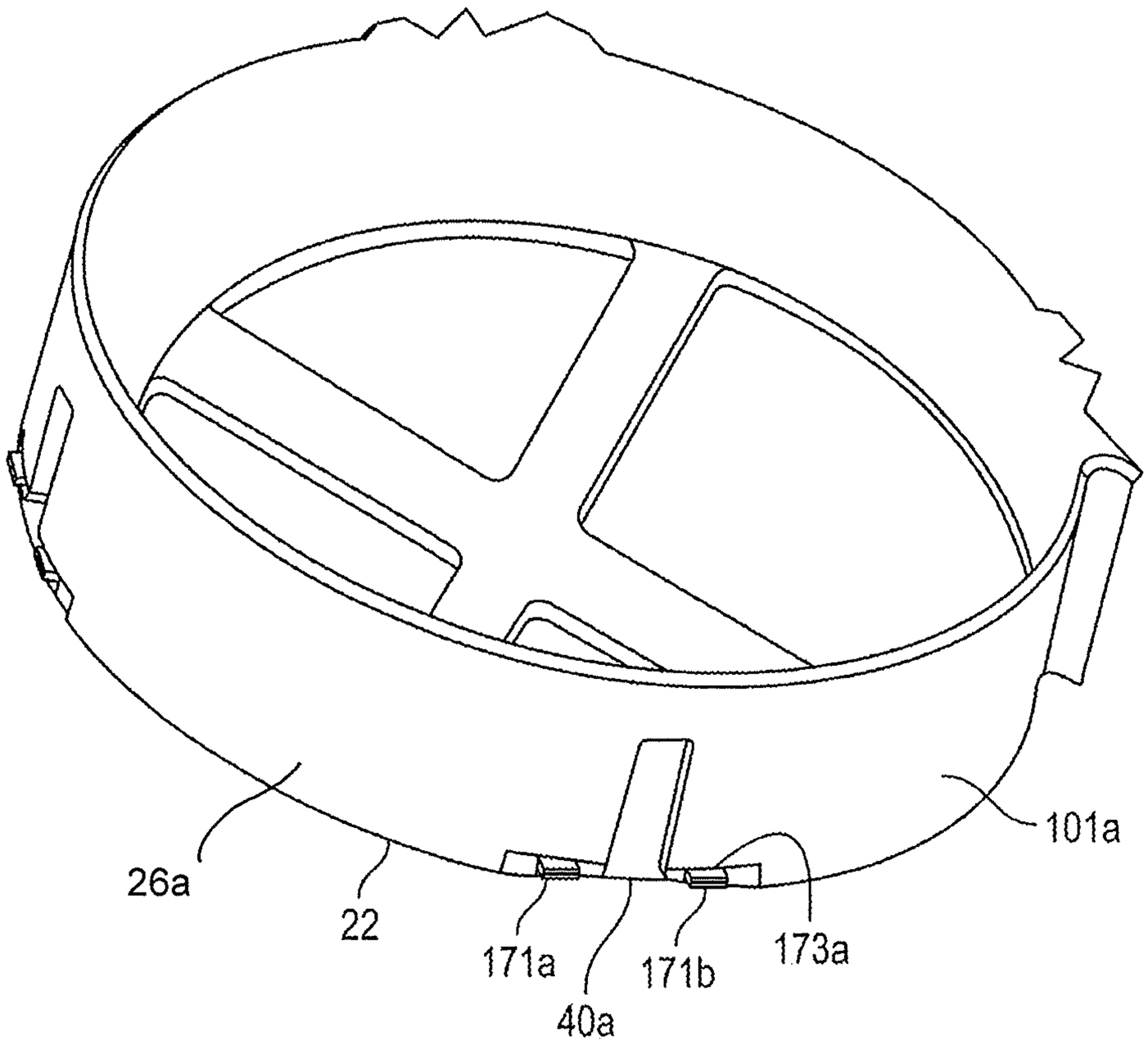
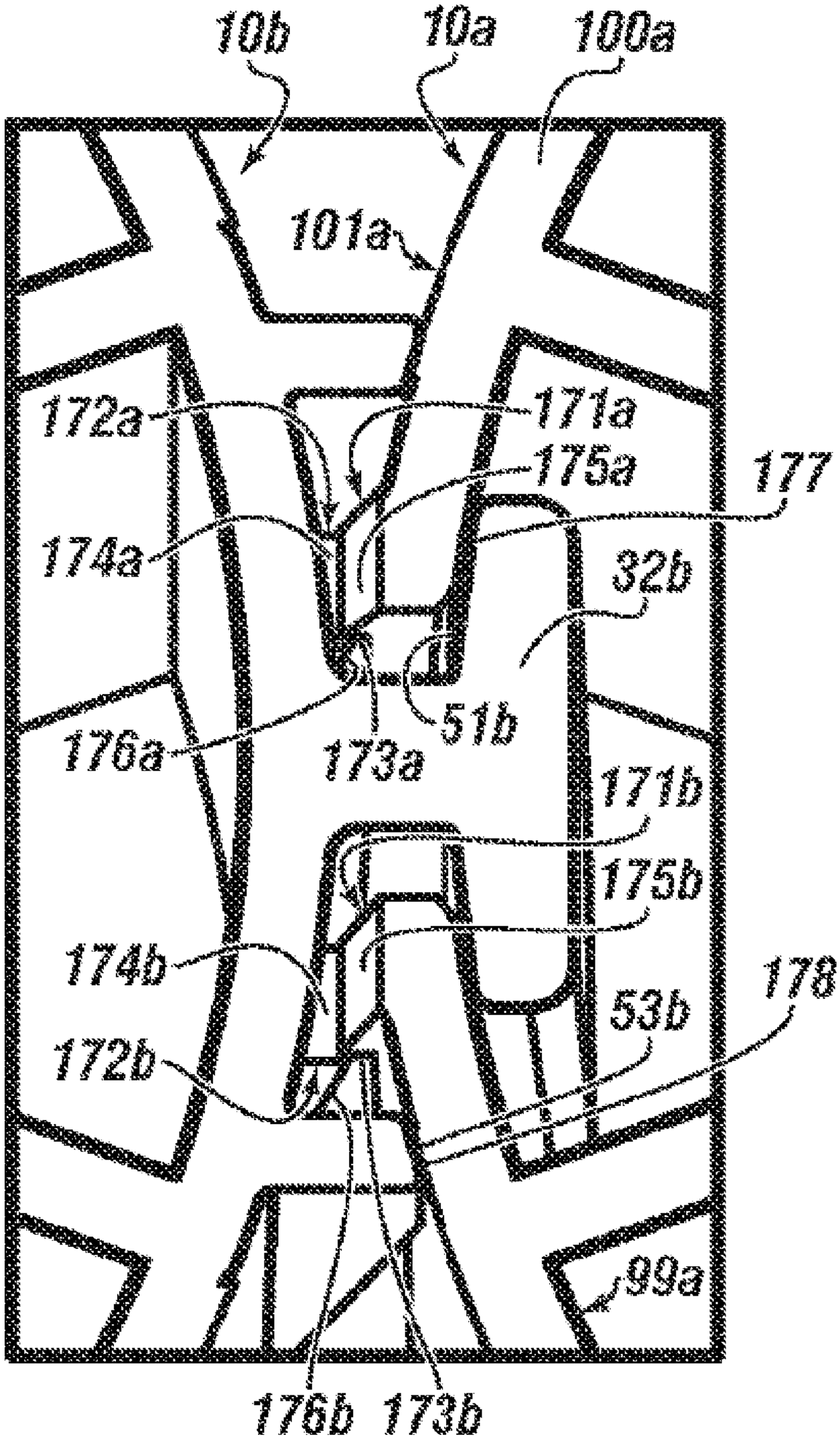


FIG. 4A

FIGURE 4B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175b
174b
178
53b
172b
99a
176b
173b

ONE PIECE WATER PERMEABLE PAVER

CROSS REFERENCE TO RELATED APPLICATIONS

The current application is continuation Patent Application based on a PCT Patent Application International Application No. PCT/US17/38557 filed on Jun. 21, 2017, which claims priority to a PCT application based on of U.S. Non-Provisional patent application Ser. No. 15/360,174, filed Nov. 23, 2016, now U.S. Pat. No. 9,670,624 issued on Jun. 6, 2017, which claims priority to and the benefit under 35 U.S.C. § 119(e) of U.S. Non-Provisional patent application Ser. No. 15/255,853, filed Sep. 2, 2016, now U.S. Pat. No. 9,617,698 issued on Apr. 11, 2017 which claims priority to and the benefit under 35 U.S.C. § 119(e) of now U.S. Provisional Patent Application Ser. No. 62/272,261, filed on Dec. 29, 2015. The disclosure of each application is hereby incorporated herein by reference in its entirety for all purposes.

FIELD

The present embodiments generally relate to a one piece water permeable paver forming a surface for traffic, such as a parking lot, a roadway, a golf cart path, a trail, a temporary roadway, a bicycle path, a jogging trail, a greenway space, a freight yard, a fire lane, a sidewalk, or another area where it is desirable for water to flow through rather than around a surface.

BACKGROUND

A need exists for a one piece water permeable paver that allows traffic and parking surfaces to be formed that enables grass to grow through the surface or contains aggregate, such as gravel, which allows water to permeate through the traffic and parking surface.

A need also exists for a one piece water permeable paver that can be a one piece molded unit created from recycled plastics, such as recycled milk bottles.

The present embodiments meet these needs.

BRIEF DESCRIPTION OF THE DRAWINGS

The detailed description will be better understood in conjunction with the accompanying drawings as follows:

FIG. **1**A depicts a top view of a one piece water permeable paver according to one or more embodiments.

FIG. **1**B depicts a side view of a second side of the one piece water permeable paver according to one or more embodiments.

FIG. **1**C depicts a side view of a fourth side of the one piece water permeable paver according to one or more embodiments.

FIG. **1**D depicts a side view of a first side of the one piece water permeable paver according to one or more embodiments.

FIG. **1**E depicts a side view of a third side of the one piece water permeable paver according to one or more embodiments.

FIG. **2** depicts a detail of an inner surface of a cell **44**, **36***d* of the one piece water permeable paver according to one or more embodiment with a parking marker.

FIG. **3** depicts a detail of a locking tab **42***a-k* according to one or more embodiments.

FIG. **4**A depicts the bottom and top of the once permeable paver feature element **266** according to one or more embodiments.

FIG. **4**B depicts a cut-away view of a first one piece permeable cell **10***b* with a locking tab **32***b* in connection with a second locking portion **40***a* of a cell **10***a* in FIG. **4**A.

The present embodiments are detailed below with reference to the listed Figures.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Before explaining the present apparatus in detail, it is to be understood that the apparatus is not limited to the particular embodiments and that it can be practiced or carried out in various ways.

The embodiments relate to a one piece water permeable paver for forming a surface suitable for traffic.

The one piece water permeable paver prevents flash flooding and thereby costly property damage and loss of life, by managing water flow and drainage in areas that otherwise present solid surfaces with little or no ability to absorb water.

The one piece water permeable paver helps improve the environment by enabling the removing of diesel, gasoline, oil and other pollutants from storm water through natural bioremediation before these pollutants enter a natural aquifer and poison shrinking water supplies which could lead to serious illness or death.

The one piece water permeable paver helps reduce rising temperatures from climate change and helps reduce environmental damage done to the planet due to the dramatic heating effects caused by the use of concrete and asphalt for traffic and parking surfaces.

The one piece water permeable paver improves the health of the planet by utilizing and recycling post-consumer and industrial waste that clog landfills. The one piece water permeable paver uses plastic trash, and recycles the plastic trash into a construction material usable to build parking lots, roadways, sidewalks and other traffic surfaces, including golf cart trails.

The one piece water permeable paver helps improve lifestyles for the handicapped or disabled persons as well as improve lifestyles for the elderly and children by enabling the construction of unobstructed and safe park trail ways. This one piece water permeable paver enables the construction of access ways to nature conservancies by providing inexpensive, natural grass and gravel ADA compliant walkways. The invention enables the construction of trails that are level and safe, preventing broken bones and other serious injuries and even death due to a fall.

The one piece water permeable paver prevents fire disasters by creating erosion resistant structures that include grass filled fire lanes so fire and emergency vehicles don't get stuck in the mud or prevented from reaching remote areas in a disaster as often happens in wildfire situations in California.

The one piece water permeable paver enables police and emergency responders to quickly install a roadway in a muddy area to quickly access a damaged area, where a permanent roadway was washed away.

The one piece water permeable paver provides roadways for occasional use by emergency vehicles and fire trucks in areas where the expense of a concrete roadway or asphalt roadway is prohibitive. The one piece water permeable paver enables the creation of inexpensive fire lanes, emergency lanes and maintenance vehicle lanes.

The embodiments relate to a one piece water permeable paver which can be interlocked together to create a system for soil stabilization. Soil stabilization can be achieved by connecting a plurality of one piece water permeable pavers together and filling the cells of the water permeable pavers with soil or aggregate.

The embodiments relate to a one piece water permeable paver for use with a storm water management system. Storm water management can be achieved by connecting together a plurality of one piece water permeable pavers and installing the connected one piece water permeable pavers adjacent a bayou or waterway.

The embodiments relate to a road formed from connected one piece water permeable pavers which have the cells are filled with aggregate.

The embodiments relate to a parking lot formed from connected one piece water permeable pavers with cells filled with dirt or grass or aggregate. In embodiments, the parking lot is an occasional use event parking lot or an industrial parking lot for staging of oil field drilling equipment.

For the purpose of this application the following definitions will be used herein.

The term "cell" as used herein can refer to the cylindrical molded shapes which are connected to either other cells or to a **24***g* to form the one piece water permeable paver. Cells can also be elliptical, rectangular, square or another polygon.

The term "inner flange" as used herein can refer to a sloped, triangular shaped structure when viewed in a side view that provides additional load support when each cell is filled with gravel, dirt, or aggregate. The inner flange specifically creates an increased surface area to prevent the one piece water permeable paver from being pushed into soil, keeping the paver level.

The term "parking marker" as used herein can refer to an insert, which can be plastic, and which provides a visual indicator creating parking zones or parking areas, and a plurality of the marking markers, used in a plurality of cells of the paver can create a parking series of dots, acting like a parking stripe. The plastic indicator can be non-deforming when driven over by a car.

Turning now to the Figures, FIG. **1**A depicts a top view of a one piece water permeable paver according to one or more embodiments.

The one piece water permeable paver **10***a* can be made from a plurality of different types of cells connected to each other, to connectors **24***a*-**241**, or to both.

The one piece water permeable paver can have a first side **12**, a second side **14** opposite the first side **12**, a third side **16** between the first side **12** and the second side **14**, and a fourth side **18** between the first side **12** and the second side **14** opposite the third side **16**.

The one piece water permeable paver **10***a* can have a plurality of outer flex joint connection cells **26***a*-**26***h*. Each outer flex joint connection cell can engage a connector from the plurality of connectors **24***a*-**241**.

Each outer flex joint connection cell can have an outer flex joint connection cell outer surface **27***a*-**27***h*.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of outer three connection cells **30***a*-**30***h*.

Each outer three connection cell **30***a*-**30***h* can be connected to one of the outer flex joint connection cells **26***a*-**26***h*.

Each outer three connection cell can have an outer three connection cell outer surface **29***a*-**29***h* respectively.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of outer two connection cells **32***a*-**32***d*.

Each outer two connection cell **32***a*-**32***d* can connect to two adjacent outer three connection cells **30***a*-**30***h*.

Each outer two connection cell can have an outer two connection cell outer surface **31***a*-**31***d*.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of inner single flex joint connection cells **34***a*-**34***h*.

Each inner single flex joint connection cell **34***a*-**34***h* can be connected to one of the connectors **24***a*-**241**.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of inner dual flex joint connection cells **36***a*-**36***d*.

Each inner dual joint connection cell can engage two connectors simultaneously.

The one piece water permeable paver **10***a* can have a plurality of inner four connection cells **38***a*-**38***d*.

Each of the inner four connection cells **38***a*-**38***d* can connect to a pair of outer three connection cells **30***a*-**30***h* and to a pair of inner single flex joint connection cells **34***a*-**34***h*.

In embodiments, the one piece water permeable paver **10***a* can have an X-shaped anchor **62***a*-**62***h* in each outer flex joint connection cell **26***a*-**26***h*.

In embodiments, the one piece water permeable paver **10***a* can have an X-shaped anchor **63***a*-**63***d* in each inner dual flex joint connection cells **36***a*-**36***d*.

In embodiments, the one piece water permeable paver **10***a* can have X-shaped anchor **64***a*-**64***d* in each of the outer two connection cells **32***a*-**32***d*.

In embodiments, the one piece water permeable paver **10***a* can have an X-shaped anchor **65***a*-**65***d* in each of the four connection inner cells **38***a*-**38***d*.

Each cell can have a center point, such as outer two connection cell **32***a* having center point **83***a*.

In embodiments, the one piece water permeable paver can have the plurality of outer flex joint connection cells **26***a*-**26***h* connecting adjacent cells at one of the clock positions: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

In embodiments, the one piece water permeable paver can have the plurality of outer three connection cells **30***a*-**30***h* connected to one adjacent outer flex joint connection cell **26***a*-**26***h*, one adjacent outer two connection cell **32***a*-**32***d* and one adjacent inner four connection cell **38***a*-**38***d* at one of the clock positions: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

In embodiments, the one piece water permeable paver can have the plurality of outer two connection cells **32***a*-**32***d* connected to two adjacent outer three connection cells **30***a*-**30***h* at one of the following clock positions on the outer surface of each cell: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

In embodiments, the one piece water permeable paver can have the plurality of inner single flex joint connection cells **34***l*-**34***h* connected to a connector **24***a*-**241** at a clock position on the outer surface of each inner single flex joint connection cell that is at one of the clock positions: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position or a 9 o'clock position.

In embodiments, the one piece water permeable paver can have the plurality of inner dual flex joint connection cells **36***a*-**36***d* connected to a connector **24***a*-**241** on the outer surface of each inner dual flex joint connection cell at one of the clock positions: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

In embodiments, the one piece water permeable paver can have the inner four connection cells **38***a*-**38***d* connected to adjacent cells at a clock position on the outer surface of each cell at one of the clock positions: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of locking tabs **42***a*-**42***f* extending from outer surfaces of cells forming the third side **16** of the one piece water permeable paver.

The one piece water permeable paver **10***a* can have a plurality of locking tabs **42***g*-**421** extending from outer surfaces of cells forming the first side **12** of the one piece water permeable paver.

Each cell can have an inner flange **60***a*. Inner flange **60***a* is depicted on an outer two connection cell **32***a*.

Each inner flange can extend toward the center point **83** of each cell. Each inner flange can extend from the bottom of the one piece water permeable paver.

FIG. **1**B depicts a side view of the second side **14** of the one piece water permeable paver **10***a* according to one or more embodiments.

According to one or more embodiments, the one piece water permeable paver **10***a* can have a plurality of fastening slots **40***a*-**40***f* formed partially through the cell outer surface of the cells of the second side **14**.

In embodiments, the plurality of fastening slots **40***a*-**40***f* can cut from the bottom **22** of the one piece water permeable paver **10***a* partially through the outer surface towards the top **20**.

FIG. **1**C depicts a side view of the fourth side **18** of the one piece water permeable paver according to one or more embodiments.

The one piece water permeable paver **10***a* can have a plurality of fastening slots **40***g*-**401** formed partially through the cell outer surface of cells that create the fourth side **18** of the one piece water permeable paver **10***a*.

In embodiments, the plurality of fastening slots **40***g*-**401** can be cut from the bottom **22** partially through the outer surface towards the top **20**.

FIG. **1**D depicts a side view of the first side **12** of the one piece water permeable paver according to one or more embodiments.

The plurality of locking tabs **42***g*-**421** can be formed on the outer surface of the outer cells extending from the bottom **22**, opposite the top **20**, of the one piece water permeable paver **10***a*. Locking tab **42***a* is also shown.

FIG. **1**E depicts a side view of the third side **16** of the one piece water permeable paver according to one or more embodiments.

The one piece water permeable paver **10***a* can have a plurality of locking tabs **42***a*-**42***f* extending from each outer surface of cells extending from the bottom **22**, opposite the top **20**, of the one piece water permeable paver **10***a*. Locking tab **42***g* is also shown.

The locking tabs of a first one piece water permeable paver can interlock with the fastening slots of an adjacent one piece water permeable paver to create a roadway, trail, or similar traffic surface.

FIGS. **1**B through **1**E depict the sides of the one piece water permeable paver.

FIG. **2** depicts a detail of an inner surface of a cell of the one piece water permeable paver according to one or more embodiment with a parking marker.

In embodiments, a parking marker **44** can be insertable into one of the cells to provide parking guidance to users, such as marking edges of parking spaces. This use of a parking marker enables a user to avoid the need for painting dirt, aggregate, or similar surface materials

An inner surface **45** of an outer three connection cell **30***d* is shown with a fastening slot **40***d*.

The fastening slot **40***d* can be tapered from the bottom of the cell towards the top.

In embodiments, each fastening slot **40***a*-**401**, shown here as **40***d*, can have an alignment opening **54** formed in the fastening slot for engaging a locking tab.

In embodiments, each fastening slot **40***a*-**401**, shown here as **40***d*, can have a tensioning rib **56** adjacent the fastening slot. In embodiments, a tensioning rib can be positioned on both sides of the fastening slot.

FIG. **3** depicts a detail of a locking tab **42***c* according to one or more embodiments.

The locking tab **42***c* can have a shaft **48** with a shaft length **49** connected to the outer surface **27***a* of one of the outer flex joint connection cells **26***a*.

The locking tab **42***c* can have a head **50** connected to the shaft **48** at an angle **47**. The angle **47** can be an angle from 80 degrees to 110 degrees from an axis of the shaft **48**.

The locking tab **42***c* can have a head **50** with a head length **61**. The head length **61** for the locking tabs can be larger than the shaft length **49**.

The head **50** can have a load surface **51**. The load surface **51** can have a slope that matches an inner surface curvature of a cell enabling the head to mate with a fastening slot.

A first sloped edge **52** can extend from the outer surface **27***a* of the outer flex joint connection cell **26***a*. The first sloped edge can be parallel with and spaced apart from the shaft **48** and also in a spaced apart relationship to the head **50**.

An outer edge **63** of the first sloped edge **52** can have a curvature complimentary to the outer surface curvature of a cell with a fastening slot into which the head interlocks.

The outer length aspect of the first sloped edge **52** can have a width larger where the first sloped edge attaches to the outer surface **27***a* than the width at the outer edge **63**. The first sloped edge can be tapered in embodiments.

A second sloped edge **53** can extend from the outer surface **27***a* of the outer flex joint connection cell **26***a*.

The second sloped edge **53** can be parallel with and spaced apart from the shaft **48** and can also be in a spaced apart relationship to the head **50**.

The second sloped edge **53** can be opposite the first sloped edge **52**.

An outer edge **55** of the second sloped edge **53** can have a curvature complimentary to the outer surface curvature of a cell with a fastening slot into which the head interlocks.

The outer length aspect of the second sloped edge **53** can have a width larger where the second sloped edge attaches to the outer surface **27***a* than the width at the outer edge **55**. The second sloped edge can be tapered in embodiments.

FIG. **4**A depict the bottom and top of the one piece perm

In embodiments the one piece water permeable paver **10***a* has a fastening slot **40***a*.

In proximity to the fastening slot **40***a* can be one or more bottom snap locking portion **171***a* and **171***b*. The bottom snap locking portion **171***a* and **171***b* may be proximate to a bottom of the once piece permeable paver **10***a*.

In embodiments, the one piece water permeable paver **10***a* has a locking tab **42***a*. In proximity to the locking tab **42***a* can be one or more top snap locking portion **172***a* and **172***b*. The top snap locking portion **172***a* and **172***b* may be proximate to a bottom **22** of the one piece permeable paver.

The bottom snap locking portion **171***a* and **171***b* can include a bottom snap locking planar surface, such as bottom

snap locking planar surface **173***a*. Similarly, top snap locking portion **172***a* and **172***b* can include a top snap locking planar surface, such as top snap locking planar surface **174***a*.

FIG. **4**B depicts cut view of a first one piece water permeable in connection with a second one piece water permeable paver.

As the pavers **10***a* and **10***b* are connected together, bottom snap locking portion **171***a* and **171***b* and top snap locking portion **172***a* and **172***b* may be movingly engaged with respective snap locking tapered surfaces **175** and **176**, as would be apparent to one of skill in the art. Once the one piece water permeable pavers **10***a* and **10***b* are connected together, the bottom and top snap locking planar surfaces **173***a* and **174***b* may be engaged. The use of the bottom and top snap locking planar surfaces **173***a* and **174***b* can provide additional load support and distribution with connected pavers **10***a* and **10***b*.

The locking tab **42***b* can include a rounded inner load surface **51***b*. The rounded inner load surface **51***b* can be configured to smoothly engage a corresponding rounded inner surface **99***a* of first paver outer wall **100***a*, such as at contact point **177**.

The load surface **51***b* can have a slope that matches an outer wall **100***a* surface curvature for its inner surface **99***a*, which can enable locking tab **42***b* to mate with the corresponding surface **99***a* proximate to the fastening slot **40***a*.

An outer sloped edge **53***b* can have a curvature complimentary to the outer wall **100***a* curvature for outer wall surface **101***a*, which can enable to the pavers **10***a* and **10***b* to come into contact at contact point **178**.

In embodiments, the one piece water permeable paver can be made from recycled plastics, such as milk bottles.

In embodiments, the one piece water permeable paver can be pigmented with soy based pigments to be environmentally friendly.

Installing the one piece water permeable pavers can be a simple six step process.

The process can include clearing and grading a ground surface, as the first step. This clearing and grading can be done by hand with a shovel for a small area or with a bulldozer for a large area.

The process can include laying and spreading ½ an inch to 8 inches of ½ inch to 1 and ½ inch diameter rock or gravel onto the cleared and graded ground, as the second step. This layer of rock or gravel can be compacted or compressed with a roller or compactor.

The process can include preassembling the one piece water permeable pavers into four interconnected pavers with the locking tabs interlocking into the slots, as the third step.

The process can include placing the preassembled one piece water permeable pavers over the compacted or compressed rock or gravel, as the fourth step.

The process can include dumping the aggregate into the cells of the one piece water permeable pavers, as the fifth step. From ¾ inch to 1 and ½ inch rock, recycled asphalt, or other aggregate can be used to evenly fill the cells.

The process can also include compacting the filled cells, forming a parking lot or traffic surface ready to use for 25 plus years without maintenance, as the sixth step.

A process to create a stabilized water permeable grass parking or traffic surface can include performing steps one, two, three and four as described above. After laying the pavers, the process can include filling the cells of the one piece water permeable pavers with soil instead of aggregate and installing seed or sod as desired.

Foot paths can also be created with the one piece water permeable pavers. Any size path can be made with the one piece water permeable pavers.

While these embodiments have been described with emphasis on the embodiments, it should be understood that within the scope of the appended claims, the embodiments might be practiced other than as specifically described herein.

What is claimed is:

1. A one piece water permeable paver construction for forming a surface suitable for supporting traffic, said construction comprising a top paver portion and a bottom paver portion;

said top paver portion including a plurality of connectors and a plurality of cells including:

a. a plurality of outer flex joint connection cells, each outer flex joint connection cell connecting to one of a plurality of connectors, each outer flex joint connection cell having an outer flex joint connection cell outer surface;

b. a plurality of outer three connection cells, each outer three connection cell connecting to one of the outer flex joint connection cells, each outer three connection cell having an outer three connection cell outer surface;

c. a plurality of outer two connection cells, each outer two connection cell connected to two of the outer three connection cells, each outer two connection cell having an outer two connection cell outer surface;

d. a plurality of inner single flex joint connection cells, each inner single flex joint connection cell connected to one of the connectors;

e. a plurality of inner dual flex joint connection cells, each inner dual flex joint connection cell engaging two connectors simultaneously;

f. a plurality of inner four connection cells, each said inner four connection cell connecting to a pair of outer three connection cells and a pair of inner single flex joint connection cells; with the connected cells forming the top paver portion having a first side, a second side opposite the first side, a third side between the first side and the second side, and a fourth side between the first side and the second side opposite the third side, and also forming a top and a bottom;

g. a plurality of top locking tabs extending from outer surfaces of outer cells of the plurality of cells that form the first side and the third side; and

said bottom paver portion including a plurality of bottom snap locking portions, said bottom snap locking portions and said top locking tabs are movingly engageable to form a top snap locking panel surface and a bottom snap locking planar surface.

2. The construction of claim **1**, comprising a parking marker insertable in one of the cells.

3. The construction of claim **1**, wherein the plurality of outer flex joint connection cells connect on an outer surface of each outer flex joint connection cell at clock positions on an outer surface consisting of: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

4. The construction of claim **1**, wherein the plurality of outer three connection cells are connected to one of the outer flex joint connection cells, one of the outer two connection cells and one inner four connection cell at clock positions on an outer surface of the outer three connection cells consisting of: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

5. The construction of claim 1, wherein the plurality of outer two connection cells connect to two outer three connection cells at clock positions on an outer surface of the outer two connection cells consisting of: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

6. The construction of claim 1, wherein the plurality of inner single flex joint connection cells are connected to one of the connectors at a clock position on an outer surface of the inner single flex joint connection cell consisting of a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

7. The construction of claim 1, wherein the plurality of inner dual flex joint connection cells connect to one of the connectors at a clock position on an outer surface of each inner dual flex joint connection cell consisting of: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

8. The construction of claim 1, wherein the inner four connection cells connect to adjacent cells at a clock position on an outer surface of each four connection inner cell consisting of: a 12 o'clock position, a 3 o'clock position, a 6 o'clock position and a 9 o'clock position.

9. The construction of claim 1, wherein the plurality of locking tabs are formed on an outer surface of the outer cells and extend from the bottom of the one piece water permeable paver.

10. The construction of claim 1, wherein further including a plurality of fastening slots, said plurality of fastening slots are cut from the bottom of the one piece water permeable paver construction partially through an outer surface of the construction towards the top.

11. The construction of claim 1, wherein each locking tab of the plurality of locking tabs comprises:

a. a shaft with a shaft length connected to the outer surface of an outer cell on the first side and the third side of the one piece water permeable paver construction;

b. a head connected to the shaft at an angle with a slope from 80 degrees to 110 degrees from the shaft, the head having a load surface that mates with an inner surface curvature of an outer cell;

c. a first sloped edge extending from the outer surface, the first sloped edge extending parallel with and spaced apart from the shaft and also in a spaced apart relationship to the head; and

d. a second sloped edge extending from the outer surface, the second sloped edge extending parallel with and spaced apart from the shaft and also in a spaced apart relationship to the head and opposite the first sloped edge.

12. The construction of claim 10, wherein at least one of the fastening slots is tapered from the bottom of the one piece water permeable paver construction narrowing towards the top.

13. The construction of claim 10, wherein at least one of the fastening slots has an alignment opening formed in the at least one fastening slot for engaging the locking tab.

14. The construction of claim 10, comprising at least one tensioning rib adjacent one of the fastening slots, wherein at least one the tensioning rib is formed on an inner side of a cell.

15. The construction of claim 1, wherein each connector has a first arm connected to a body and a second arm connected to the body, wherein each arm engages a different cell.

16. The construction of claim 1, wherein each cell has an inner flange mounted to an inner surface of each cell, the inner flange extending toward a center point of each cell, and the inner flange mounted to extend from the bottom of the one piece water permeable paver construction.

17. The construction of claim 1, comprising at least one of: an X-shaped anchor connected to an inner surface of outer flex joint connection cells, and an X-shaped anchor connected to an inner surface of inner dual flex joint connection cells, an X-shaped anchor connected to an inner surface of outer two connection cells, and an X-shaped anchor connected to an inner surface of four connection inner cells.

18. The construction of claim 15, wherein a body of the connector is twice as long as either the first arm or the second arm.

19. The construction of claim 18, wherein the body is U-shaped.

20. The construction of claim 1, comprising a light module in at least one of the outer cells, inner cells of the plurality of cells, and combinations thereof.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 10,954,639 B2
APPLICATION NO. : 16/290011
DATED : March 23, 2021
INVENTOR(S) : Stiles

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

Column 1, (63), Lines 1-2:
Delete "Continuation of application No. 15/255,853, filed on Sep. 2, 2016, now Pat. No. 9,617,698."
and insert --Continuation of international application No. PCT/US17/38557, filed on Jun. 21, 2017.--

Signed and Sealed this
Seventeenth Day of May, 2022

Katherine Kelly Vidal

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office